CLAIMS:

1. A fluid monitoring system, comprising:

a housing positioned in-ground above a buried fluid conduit, the housing having a lockable access hatch to allow access to an internal volume of the housing from surface level;

at least one sensor accessible through the internal volume and arranged to sense at least one condition of fluid in the fluid conduit; and

a wireless telemetry unit supported in the housing and coupled to receive output signals from the at least one sensor in relation to the at least one condition.

2. The system of claim 1, wherein the wireless telemetry unit is free of reliance on an external power source.

3. The system of claim 1 or claim 2, wherein the wireless telemetry unit is arranged to wirelessly transmit data corresponding to the output signals to a remote network node.

4. The system of any one of claims 1 to 3, wherein the housing comprises substantially non-conductive material to allow transmission of data from the wireless telemetry unit while the access hatch is closed.

5. The system of any one of claims 1 to 4, wherein the lockable access hatch comprises a solid lid formed of a strong composite material that minimally attenuates radio wave transmissions passing therethrough.

6. The system of any one of claims 1 to 5, wherein the housing is formed at least predominantly of a substantially rigid plastic material.

7. The system of any one of claims 1 to 6, wherein the access hatch bars access to the internal volume when closed and locked.

8. The system of any one of claims 1 to 7, wherein the telemetry unit has an antenna and the telemetry unit is mounted to the housing so that the antenna is positioned below the access hatch and does not extend through the access hatch.

9. The system of any one of claims 1 to 8, further comprising a lid position sensor disposed in the housing and communicatively coupled to the telemetry unit to provide a signal thereto to indicate a sensed position of a lid of the housing.

10. The system of any one of claims 1 to 9, wherein the at least one sensor is arranged to sense at least one of fluid flow, fluid pressure, noise and water quality.

11. The system of claim 10, wherein the at least one sensor is arranged to sense fluid flow, fluid pressure and noise.

12. The system of claim 10, wherein the at least one sensor is arranged to sense fluid flow, fluid pressure and water quality.

13. The system of any one of claims 1 to 12, wherein the telemetry unit comprises a controller to control operation of the at least one sensor.

14. The system of claim 13, wherein the telemetry unit is configured to periodically cause the at least one sensor to turn on, generate an output signal corresponding to each sensed at least one condition and then turn off.

15. The system of claim 13 or claim 14, wherein the telemetry unit comprises a power source to power the controller and to power the at least one sensor.

16. The system of claims 13 to 15, wherein the controller is configured to compare sensor values corresponding to the received output signals to an expected range of values for each sensor and to send an alarm message to a remote network node if the sensor values for at least one sensor fall outside the expected range for that sensor.

17. The system of claims 1 to 16, wherein the telemetry unit comprises a long-life battery.

18. The system of claim 17, wherein the long-life battery has sufficient stored energy to support normal operation of the telemetry unit for several years.

19. The system of claims 1 to 18, wherein the telemetry unit and the at least one sensor are configured for low power consumption.

20. A fluid monitoring system, comprising:

a plurality of in-ground installations, each installation comprising a fluid monitoring system according to any one of claims 1 to 19; and

a server to receive data representative of sensed fluid conditions from the wireless telemetry units of respective installations via a wireless network.

21. The system of claim 20, wherein the installations are positioned within a water supply and drainage zone so that monitoring by the server of sensed fluid conditions at each installation allows identification of one or more conditions of interest within the water supply and drainage zone.

22. The system of claim 21, wherein the at least one sensor of at least one of the installations is arranged to sense at least one condition of fluid that is different from the at least one condition of fluid arranged to be sensed by the at least one sensor of another of the installations.

23. The system of claim 21 or claim 22, wherein one of the installations is positioned at each main inlet conduit of the supply and drainage zone.

24. The system of any one of claims 21 to 23, wherein some of the installations are positioned around an outside of the supply and drainage zone and fewer of the installations are positioned in inner areas of the supply and drainage zone.

25. A fluid monitoring system, comprising:

a plurality of sensors positioned to sense conditions of at least one buried fluid conduit;

a plurality of wireless telemetry units, each telemetry unit positioned within an in-ground housing proximate at least one of the plurality of sensors and coupled thereto to receive output signals corresponding to sensed conditions; and

a server to communicate with the wireless telemetry units via a wireless network, to receive data representative of the sensed conditions.

26. The system of any one of claims 20 to 25, wherein each wireless telemetry unit is free of reliance on an external power source.

27. The system of any one of claims 20 26, wherein the server comprises program code to process the received data representative of the sensed conditions according to a set of stored rules accessible to the server.

28. The system of claim 27, wherein processing of the received data includes accessing stored historical data received from the wireless telemetry units and determining whether an event of interest appears to be occurring or is likely to occur in relation to the at least one conduit.

29. The system of any one of claims 20 to 28, wherein the server comprises an interface component to communicate with a client device in relation to the received data representative of the sensed conditions.

30. A fluid monitoring method, comprising:

providing a wireless telemetry unit in-ground above a buried fluid conduit, the wireless telemetry unit coupled to receive output signals from at least one sensor arranged to sense at least one condition of fluid in the fluid conduit, the at least one sensor relying on power from the wireless telemetry unit;

selectively providing power from the wireless telemetry unit to the at least one sensor;

receiving at the wireless telemetry unit output signals from the at least one sensor indicative of at least one fluid condition in the fluid conduit; and

discontinuing power from the wireless telemetry unit to the at least one sensor after the receiving.

31. The method of claim 30, wherein the providing power is selected to occur at predetermined intervals.

32. The method of claim 30 or claim 31, wherein the wireless telemetry unit is free of reliance on an external power source.

33. The method of any one of claims 30 to 32, further comprising transmitting a message from the wireless telemetry unit to a remote server, the message containing data based on the output signals from the at least one sensor.

34. The method of any one of claims 30 to 33, further comprising waiting a predetermined time between the providing power and the receiving output signals to allow the at least one sensor to become ready to provide the output signals.

35. The method of any one of claims 30 to 34, wherein the wireless telemetry unit is positioned in an in-ground lockable housing accessible from surface level.

36. The method of any one of claims 30 to 35, further comprising the wireless telemetry unit processing the output signals to determine whether an alarm condition exists.

37. The method of claim 36, further comprising the wireless telemetry unit sending an alarm message to a remote network node if an alarm condition is determined to exist.

38. A fluid monitoring method, comprising:

receiving at a server messages from a plurality of wireless telemetry units communicatively coupled to a plurality of sensors, at least one sensor coupled to each wireless telemetry unit being positioned to sense a condition of at least one buried fluid conduit, the messages comprising data indicative of one or more of the sensed conditions; and

processing the message data to infer trends and/or determine an event of interest in relation to the at least one buried fluid conduit.

39. The method of claim 33, further comprising:

processing the message data to determine whether an alarm, fault or special condition is indicated in relation to one or more conditions of the at least one buried fluid conduit;

transmitting a notification message to at least one predetermined notification recipient if the server determines that an alarm, fault or special condition is indicated.

40. The method of claim 38 or claim 39, wherein the event of interest comprises a fluid theft or a fluid leak.

41. A system substantially as hereinbefore described with reference to the drawings.

42. A wireless telemetry unit substantially as hereinbefore described with reference to the drawings.

43. A method performed by a server substantially as hereinbefore described with reference to the drawings.

44. A method performed by a wireless telemetry unit substantially as hereinbefore referenced.

CLAIMS:

1. A fluid monitoring system, comprising:

a housing positioned in-ground above a buried fluid conduit, the housing having a lockable access hatch to allow access to an internal volume of the housing from surface level;

at least one sensor accessible through the internal volume and arranged to sense at least one condition of fluid in the fluid conduit; and

a wireless telemetry unit supported in the housing and coupled to receive output signals from the at least one sensor in relation to the at least one condition;

wherein the telemetry unit comprises a controller to control operation of the at least one sensor.

2. The system of claim 1, wherein the wireless telemetry unit is free of reliance on an external power source.

3. The system of claim 1 or claim 2, wherein the wireless telemetry unit is arranged to wirelessly transmit data corresponding to the output signals to a remote network node.

4. The system of any one of claims 1 to 3, wherein the housing comprises substantially non-conductive material to allow transmission of data from the wireless telemetry unit while the access hatch is closed.

5. The system of any one of claims 1 to 4, wherein the lockable access hatch comprises a solid lid formed of a strong composite material that minimally attenuates radio wave transmissions passing therethrough.

6. The system of any one of claims 1 to 5, wherein the housing is formed at least predominantly of a substantially rigid plastic material.

7. The system of any one of claims 1 to 6, wherein the access hatch bars access to the internal volume when closed and locked.

8. The system of any one of claims 1 to 7, wherein the telemetry unit has an antenna and the telemetry unit is mounted to the housing so that the antenna is positioned below the access hatch and does not extend through the access hatch.

9. The system of any one of claims 1 to 8, further comprising a lid position sensor disposed in the housing and communicatively coupled to the telemetry unit to provide a signal thereto to indicate a sensed position of a lid of the housing.

10. The system of any one of claims 1 to 9, wherein the at least one sensor is arranged to sense at least one of fluid flow, fluid pressure, noise and water quality.

11. The system of claim 10, wherein the at least one sensor is arranged to sense fluid flow, fluid pressure and noise.

12. The system of claim 10, wherein the at least one sensor is arranged to sense fluid flow, fluid pressure and water quality.

13. The system of claim 1, wherein the telemetry unit is configured to periodically cause the at least one sensor to turn on, generate an output signal corresponding to each sensed at least one condition and then turn off.

14. The system of claims 1 to 13, wherein the telemetry unit comprises a power source to power the controller and to power the at least one sensor.

15. The system of claims 1 to 14, wherein the controller is configured to compare sensor values corresponding to the received output signals to an expected range of values for each sensor and to send an alarm message to a remote network node if the sensor values for at least one sensor fall outside the expected range for that sensor.

16. The system of claims 1 to 15, wherein the telemetry unit comprises a long-life battery.

17. The system of claim 16, wherein the long-life battery has sufficient stored energy to support normal operation of the telemetry unit for several years.

18. The system of claims 1 to 17, wherein the telemetry unit and the at least one sensor are configured for low power consumption.

19. A fluid monitoring system, comprising:

a plurality of in-ground installations, each installation comprising a fluid monitoring system according to any one of claims 1 to 18; and

a server to receive data representative of sensed fluid conditions from the wireless telemetry units of respective installations via a wireless network.

20. The system of claim 19, wherein the installations are positioned within a water supply and drainage zone so that monitoring by the server of sensed fluid conditions at each installation allows identification of one or more conditions of interest within the water supply and drainage zone.

21. The system of claim 20, wherein the at least one sensor of at least one of the installations is arranged to sense at least one condition of fluid that is different from the at least one condition of fluid arranged to be sensed by the at least one sensor of another of the installations.

22. The system of claim 20 or claim 21, wherein one of the installations is positioned at each main inlet conduit of the supply and drainage zone.

23. The system of any one of claims 20 to 22, wherein some of the installations are positioned around an outside of the supply and drainage zone and fewer of the installations are positioned in inner areas of the supply and drainage zone.

24. A fluid monitoring system, comprising:

a plurality of sensors positioned to sense conditions of at least one buried fluid conduit;

a plurality of wireless telemetry units, each telemetry unit positioned within an in-ground housing proximate at least one of the plurality of sensors and coupled thereto to receive output signals corresponding to sensed conditions and wherein each telemetry unit comprises a controller to control operation of the at least one sensor; and

a server to communicate with the wireless telemetry units via a wireless network, to receive data representative of the sensed conditions.

25. The system of any one of claims 19 to 24, wherein each wireless telemetry unit is free of reliance on an external power source.

26. The system of any one of claims 19 to 25, wherein the server comprises program code to process the received data representative of the sensed conditions according to a set of stored rules accessible to the server.

27. The system of claim 26, wherein processing of the received data includes accessing stored historical data received from the wireless telemetry units and determining whether an event of interest appears to be occurring or is likely to occur in relation to the at least one conduit.

28. The system of any one of claims 19 to 27, wherein the server comprises an interface component to communicate with a client device in relation to the received data representative of the sensed conditions.

29. A fluid monitoring method, comprising:

providing a wireless telemetry unit in-ground above a buried fluid conduit, the wireless telemetry unit coupled to receive output signals from at least one sensor arranged to sense at least one condition of fluid in the fluid conduit, the at least one sensor relying on power from the wireless telemetry unit, and the wireless telemetry unit comprising a controller to control operation of the at least one sensor;

selectively providing power from the wireless telemetry unit to the at least one sensor;

receiving at the wireless telemetry unit output signals from the at least one sensor indicative of at least one fluid condition in the fluid conduit; and

discontinuing power from the wireless telemetry unit to the at least one sensor after the receiving.

30. The method of claim 29, wherein the providing power is selected to occur at predetermined intervals.

31. The method of claim 29 or claim 30, wherein the wireless telemetry unit is free of reliance on an external power source.

32. The method of any one of claims 29 to 31, further comprising transmitting a message from the wireless telemetry unit to a remote server, the message containing data based on the output signals from the at least one sensor.

33. The method of any one of claims 29 to 32, further comprising waiting a predetermined time between the providing power and the receiving output signals to allow the at least one sensor to become ready to provide the output signals.

34. The method of any one of claims 29 to 33, wherein the wireless telemetry unit is positioned in an in-ground lockable housing accessible from surface level.

35. The method of any one of claims 29 to 34, further comprising the wireless telemetry unit processing the output signals to determine whether an alarm condition exists.

36. The method of claim 35, further comprising the wireless telemetry unit sending an alarm message to a remote network node if an alarm condition is determined to exist.

37. A fluid monitoring method, comprising:

receiving at a server messages from a plurality of wireless telemetry units communicatively coupled to a plurality of sensors, at least one sensor coupled to each wireless telemetry unit being positioned to sense a condition of at least one buried fluid conduit, the messages comprising data indicative of one or more of the sensed conditions; and

processing the message data to infer trends and/or determine an event of interest in relation to the at least one buried fluid conduit.

38. The method of claim 37, further comprising:

processing the message data to determine whether an alarm, fault or special condition is indicated in relation to one or more conditions of the at least one buried fluid conduit;

transmitting a notification message to at least one predetermined notification recipient if the server determines that an alarm, fault or special condition is indicated.

39. The method of claim 37 or claim 38, wherein the event of interest comprises a fluid theft or a fluid leak.